ORIGINAL ARTICLE

Genital herpes serotesting: a study of the epidemiology and patients' knowledge and attitude among STD clinic attenders in Coventry, UK

N Narouz, P S Allan, A H Wade, S Wagstaffe

Sex Transm Infect 2003;**79**:35–41

See end of article for authors' affiliations

Correspondence to: Dr Noshi Narouz, Department of GU Medicine, Coventry and Warwickshire Hospital, Coventry CV1 4FH, UK; noshinarouz@msn.com

Accepted for publication 17 July 2002

Objectives: To examine the seroprevalence and correlates of antibodies to herpes simplex viruses type 1 (HSV-1) and type 2 (HSV-2), and to assess patients' knowledge and attitude towards genital herpes infection and its serotesting, before and after counselling.

Methods: A cross sectional study among genitourinary medicine (GUM) clinic attenders in Coventry, a UK metropolitan city. Participants were asked to complete a self administered questionnaire before and after counselling. Patients were counselled before testing and after receiving the result. A commercially available enzyme immunoassay (EIA) was used to identify HSV-1 and HSV-2 antibodies (Gull/Meridian EIA).

Results: 223 patients participated in the study (97% of eligible patients). Overall, prevalence of HSV-2 antibody was 43/216 (20%) (19/103, 18% for males and 24/113 (21%) for females, p=0.61) while prevalence of HSV-1 antibody was 129/215 (60%) (60% for both sexes, p=0.91). In the multivariate analysis HSV-2 seropositivity was higher among black people and those with a history of genital herpes. HSV-1 seropositivity was independently associated with less education, increased years of sexual activity (between 14–25 years), and history of cold sores. The majority of patients wanted this serotesting to be available in the clinic (204/222 (92%) before and 216/218 (99%) after counselling, p=0.0003) and 97% accepted the test when offered. Only three patients regretted having the test and four patients contacted the department within 6 months of receiving the results for more counselling.

Conclusion: The vast majority of the study population not only wanted to be tested, but accepted the test when offered. HSV-2 infection is common and largely unrecognised among our study population. The psychological impact of introducing type specific HSV serological testing in a clinical setting seems to be minimal. Counselling could improve patients' awareness of the infection and the acceptability of the test and its results.

Genital herpes infection is the most common cause of genital ulceration, in both the developed world and in developing countries.[1 2] The annual number of reported cases of genital herpes presenting to genitourinary medicine (GUM) clinics in England and Wales increased fourfold between 1976 and 1996.[3] In the United States, HSV-2 seroprevalence rose from 16% in 1978 to 22% in 1990.[4 5]

Seroprevalence studies revealed that we diagnose only about 20% of patients with genital herpes and that the majority of these cases are unrecognised by both patients and clinicians.[6] Clearly, undiagnosed genital herpes infections are the major factor in fuelling the genital herpes epidemic, as source partners in most transmission events are unaware that they have genital herpes. Patients shed the virus and transmit it even in the absence of clinical signs.[7] Although the efficacy of transmission is higher at the time of lesions, most transmission has been shown to occur during periods of asymptomatic viral shedding.[8 9]

Accurate type specific serological tests can differentiate HSV-1 and HSV-2 antibodies and help in the diagnosis of these cases. Commercially reliable assays have been available for the last few years and pressure has been increasing to use these tests, at least in populations with a high prevalence rate (for example, STD clinic attenders). To plan a management strategy for the prevention and treatment of genital herpes, we need to assess the prevalence of genital herpes in different geographical areas and study the impact on resources as well as the cost effectiveness of testing. We also need to assess patients' and clinicians' knowledge, concern, attitude, and perception. We report the seroprevalence and correlates of HSV-1 and HSV-2 antibodies among STD clinic attenders in Coventry, United Kingdom. We also assessed patients' knowledge, attitude, and perception of this infection and its serotesting, before and after counselling.

METHODS

Study population

Consecutive patients presenting with a new problem at the GUM clinic in Coventry and having a blood test for routine syphilis screening were asked to participate voluntarily. Study clinics represented equally the different daily clinical sessions. Participants were not known to be HIV positive. After verbal consent, eligible patients were asked to complete a self administered questionnaire. During the medical consultation, demographic details and sexual history were taken. At the end of the consultation, patients were counselled (pretest counselling) for 5–10 minutes about genital herpes and its serotesting and were asked to complete another copy of the same questionnaire. When the results were given a week later, patients were counselled again (post-test counselling) and asked whether they regretted having the test. Post-test counselling (3–5 minutes) discussed the results of serotesting and any other points raised by patients, and answered their questions.

The questionnaire (table 1) can arbitrarily be divided into three sections (A, B, C): section A (questions 1–8) to assess patients' knowledge about genital herpes, section B (questions 9, 10, 11) to evaluate patients' feeling towards genital herpes infection, and section C (questions 12, 13) to examine

Table 1 The questionnaire (short version)

Section (A)

Q1: Genital herpes is a sexually transmitted infection?
□ True □ False □ Not sure

Q2: Genital herpes infection is caused by a virus?
□ True □ False □ Not sure

Q3: Genital herpes is a common infection?
□ True □ False □ Not sure

Q4: The type of the virus causing cold sores can cause genital herpes?
□ True □ False □ Not sure

Q5: Genital herpes infection:
□ Can be treated and cured □ Can be treated but not cured □ Can not be treated or cured

Q6: Most of the people infected with genital herpes are aware that they had been infected?
□ True □ False □ Not sure

Q7: Patients with genital herpes infection can still produce the virus even when they have no genital symptoms?
□ True □ False □ Not sure

Q8: Patients with genital herpes infection can still infect their partners even when they have no genital symptoms?
□ True □ False □ Not sure

Section (B)

Q9: Which one of the following sexually transmitted infections – in your opinion – is the worst?
□ Chlamydia □ Gonorrhoea □ Genital herpes

Q10: What would be the effect on you if you had been diagnosed with genital herpes?
1 No effect 2 Mild 3 Moderate 4 Severe 5 Very severe

Q11: What would be the effect on you if your partner had been diagnosed with genital herpes?
1 No effect 2 Mild 3 Moderate 4 Severe 5 Very severe

Section (C)

Q12: If a blood test could help in the diagnosis of previous genital herpes infection, would you support the availability of this test in GU clinics?
□ Yes □ No □ Not sure

Q13: If a blood test was available, would you prefer this testing:
□ Included in the routine screen or □ Only used in selected cases

patients' attitude towards serotesting. We evaluated the answers to section A (Q1–Q8) in two different ways. Firstly, we applied a scoring system in which we marked the answer to each question for each patient, before and after counselling, giving +1 for the correct answer, −1 for the incorrect answer, and 0 for "not sure." Secondly, we calculated the percentage of correct, incorrect, and "not sure" answers for all eight questions of all the participants, before and after counselling.

Pretest counselling included all the points mentioned in the questionnaire. Counselling was carried out by the same physician to maintain consistency. Study investigations were carried out during routine busy clinics. Before discharge, patients were advised to contact the study physicians or the health advisers should they have any concern. Ethics committee approval was obtained for the study.

Laboratory methods

All samples were tested in the local PHLS laboratory. Collected sera were stored at –20°C until the time of processing. A commercially available enzyme immunoassay (EIA) was used. This was based on a type specific glycoprotein G1 (gG-1) from HSV-1 and gG-2 from HSV-2 (Gull/Meridian gG EIA, Meridian Diagnostics Inc, Salt Lake City, UT, USA). The laboratory methods have been described elsewhere.[10–12]

Statistical analysis

Logistic regression models were used to identify the potential risk factors for HSV-1 and HSV-2 infections. Potential risk factors for HSV-1 and HSV-2 antibodies were identified using univariate logistic regression models. These factors were then used in the multivariate logistic regression model. The χ^2 test was used to identify any difference between the sexes in the prevalence of HSV-1 and HSV-2 antibodies. The difference in age between males and females was tested using the Mann-Whitney U test.

Change in score from before counselling to after counselling for questions 1–8 of the self administered questionnaire was analysed using the Wilcoxon signed rank test for paired data. In question 9, we compared those who considered genital herpes is worse than chlamydia or gonorrhoea against those who considered that chlamydia or gonorrhoea is worse than genital herpes. The change in the opinions before and after counselling was analysed using the McNemar's test for paired data. The Wilcoxon signed rank test for paired data was also used to test the difference between the distribution of scores to questions 10 and 11. For questions 12 and 13, where the answers were given in three categories, the difference was analysed using the χ^2 test. We acknowledge that although the χ^2 test does not incorporate the paired structure of the data, it was used for simplicity.

RESULTS

Two hundred and twenty three (107 males and 116 females) of 230 (97%) eligible clinic attenders, over a 6 month period, completed the questionnaire. Four of those who did not participate said they did not think they needed it, and three did not give a reason. All questionnaires were suitable for analysis, although data were missing in a few of the questions. Sufficient serum for testing was available in 220 participants. On testing, three samples gave equivocal results for both types of HSV, two for HSV-1 and one for HSV-2. Blood testing was not repeated for equivocal results. Table 2 shows participants' general characteristics. The age was significantly different between males and females ($p<0.001$). Results of serotesting for HSV-1 and HSV-2 antibodies are shown in table 2.

Only 14/42 (33%) participants with antibody to HSV-2 gave a history of genital herpes. In contrast, 14/29 (48%) patients giving a history of genital herpes had HSV-2 antibody. Four per cent of patients (3/68) with no antibodies to either HSV-1 or HSV-2 had a history of genital herpes. The prevalence of HSV-2 antibody was similar in patients with or without antibody to HSV-1 (25/128 (20%) and 18/86 (21%), respectively). A previous history of genital herpes was reported by 7/18 (39%)

Table 2 Characteristics of study population and seroprevalence of HSV-1 and HSV-2 antibodies

	All patients	Males	Females
Age: median (range)	28 (16–66)	31 (16–66)	26 (16–65)
Education: No. (%)			
⩾ University education	74/220 (34%)	36/105 (34%)	38/115 (33%)
< University education	146/220 (66%)	69/105 (66%)	77/115 (67%)
Ethnicity: No (%)			
Caucasian	189/221 (85%)	85/106 (80%)	104/115 (90%)
Black	17/221 (8%)	12/106 (11%)	5/115 (4%)
Asian	11/221 (5%)	7/106 (7%)	4/115 (3%)
Others	4/221 (2%)	2/106 (2%)	2/115 (2%)
Occupation: No (%)			
Managerial/professional	35/219 (16%)	26/105 (25%)	9/114 (8%)
Skilled non-manual	31/219 (14%)	4/105 (4%)	27/114 (24%)
Skilled manual	13/219 (6%)	13/105 (12%)	0 (0%)
Unskilled/partially skilled	60/219 (27%)	30/105 (29%)	30/114 (26%)
Students	32/219 (15%)	11/105 (10%)	21/114 (18%)
Others (unemployed, housewives..)	48/219 (21%)	21/105 (20%)	27/114 (24%)
No of lifetime partners: No (%)			
<5	86/221 (39%)	27/106 (25%)	59/115 (51%)
5–19	91/221 (41%)	45/106 (42%)	46/115 (40%)
⩾20	44/221 (20%)	34/106 (32%)	10/115 (9%)
Sexual attitude: No (%)			
Heterosexuality:	214/222 (96%)	100/106 (94%)	114/116 (98%)
Presenting problem: No (%)			
Genital symptom	160/221 (72%)	78/105 (74%)	82/116 (71%)
Check up (asyptomatic)	61/221 (28%)	27/105 (26%)	34/116 (29%)
History of genital herpes: No (%)	30/215 (14%)	15/103 (15%)	15/112 (13%)
History of current STI: No (%)	57/218 (26%)	31/104 (30%)	26/114 (23%)
History of previous STI: No (%)	74/222 (33%)	41/106 (39%)	33/116 (28%)
History of drug abuse (ever): No (%)			
Non-injecting:	72/221 (33%)	45/106 (42%)	27/115 (23%)
Injecting:	1/221 (0.4%)	1/105 (0.9%)	0/116 (0%)
Prevalence: No (%)			
Positive HSV-1	129/215 (60%)	62/104 (60%)	67/111 (60%)
(95% CI)	(53.45 to 66.55)	(50.19 to 69.05)	(51.26 to 69.46)
p value*			0.91
Positive HSV-2	43/216 (20%)	19/103 (18%)	24/113 (21%)
(95% CI)	(14.58 to 25.23)	(10.96 to 25.94)	(13.70 to 28.78)
p value*			0.61
Positive HSV-1 and HSV-2	25/214 (12%)	11/103 (11%)	14/111 (13%)
(95% CI)	(7.38 to 15.99)	(4.71 to 16.64)	(6.44 to 18.79)
p value*			0.66
Negative HSV-1 and HSV-2	68/214 (32%)	34/103 (33%)	34/111 (31%)
(95% CI)	(25.54 to 38.01)	(23.93 to 42.09)	(22.06 to 39.21)
p value*			0.71

*χ^2 test. p Value shows the significant difference between the results in males and females.

patients with antibody to HSV-2 only, compared with 7/24 (29%) patients with both HSV-1 and HSV-2 antibodies.

Tables 3 and 4 show the relation between antibodies to HSV-2 and HSV-1 and some of the studied sociodemographic, sexual behaviour, and clinical factors. Variables of sexual orientation, injecting drugs, and sex with prostitutes were not tested, because of the small number of patients involved. Unemployed people and housewives were not included in the tables in the variable of occupation because of their heterogeneity. For HSV-2 antibody, increased risk of infection was associated with increasing age, black race, lower education, earlier age of sexual intercourse, increasing years of sexual activity, number of lifetime partners (⩾5), not using condoms, other STIs, patient's history of genital herpes and manual jobs. However, in the univariate analysis, only being black or having a history of genital herpes had a significant association with the HSV-2 antibody. This was confirmed in the multivariate analysis. A rise in the risk of HSV-1 infection was observed with increasing age, being black, lower education, increasing years of sexual activity, number of lifetime partners (⩾5), patient history of cold sores, other STIs, and manual jobs. In the univariate analysis, the association was significant only for age (⩾35 years), lower education, increasing years of sexual activity (between 14 and 25 years), and patient history of cold sores. However, this association was independently significant only for lower education, increasing years of sexual activity (between 14 and 25 years), and patient's history of cold sores.

The answers to the questionnaire are given in table 5. Answers were compared before and after counselling. For section A (Q1–Q8), the total scoring is presented in the table. Overall, 184/217 (85%) participants showed improved scores after counselling compared with scores before counselling. One hundred and six out of 217 participants (49%) achieved ⩾50% improvement. Of those who did not score the full mark before counselling, 114/199 (57%) achieved it after counselling. Eleven out of 217 participants (5%) scored less after counselling, while 14/217 (6%) scored the full mark before and after counselling. Of the answers to section A (Q1–Q8) by all participants before counselling, 59% were correct, 12% incorrect, and 28% "not sure." After counselling, these changed to 92% correct, 5% incorrect and 3% "not sure."

The majority of participants were aware that genital herpes is an STD (184/222 (83%) before and 204/218 (93%) after counselling) and that it is caused by a virus (147/222 (66%), increased to 211/218 (97%)). Only 122/222 (55%) were aware that the virus causing cold sores can cause genital herpes (increased to 206/218, 94% after counselling). Fifty four per cent of the answers to the questions about unrecognised infection and asymptomatic shedding were correct (increased

Table 3 The relation between HSV-2 antibodies and sociodemographic, sexual behaviour, and clinical variables

	HSV-2	Univariate model		Multivariate model		
Variable	No (%)	OR	95% CI	OR	p Value	95% CI
Age (years)						
<25	8/62 (13)	1.00				
25–34	20/99 (20)	1.71	0.70 to 4.16			
⩾35	15/55 (27)	2.53	0.98 to 6.55			
Ethnicity						
White	35/185 (19)	1.00		1.00	0.021	
Black	6/14 (43)	3.21	1.05 to 9.86	4.11		1.23 to 13.69
Education						
⩾University level	12/73 (16)	1.00				
<University level	30/140 (21)	1.39	0.66 to 2.90			
Age at first sex (years)						
<18	34/149 (23)	1.00				
18–19	5/36 (14)	0.55	0.20 to 1.51			
⩾20	2/26 (8)	0.28	0.06 to 1.25			
Years of sexual activity						
<5	3/28 (11)	1.00				
5–14	19/105 (18)	1.84	0.50 to 6.73			
15–24	12/51 (24)	2.56	0.66 to 10.00			
⩾25	7/27 (26)	2.92	0.67 to 12.75			
Lifetime partners						
<5	15/83 (18)	1.00				
5–9	10/48 (21)	1.23	0.50 to 3.00			
⩾10	17/84 (20)	1.15	0.53 to 2.49			
Use of condom						
Never	8/24 (33)	1.00				
Ever	34/191 (18)	0.43	0.17 to 1.09			
History of other STIs:						
Yes	23/92 (25)	1.00				
No	19/123 (15)	0.55	0.28 to 1.08			
Patient history of genital herpes:						
Yes	14/29 (48)	1.00		1.00	<0.001	
No	28/185 (15)	0.19	0.08 to 0.44	0.18		0.07 to 0.43
Occupation						
Intellectual	8/65 (12)	1.00				
Manual	14/70 (20)	1.78	0.69 to 4.58			
Student	4/31 (13)	1.06	0.29 to 3.81			

to 90% after counselling). Before counselling, about two thirds of participants expected the effect on them if they (Q10) or their partners (Q11) had been diagnosed with genital herpes infection to be moderate to severe (152/222 (68%) and 135/222 (61%), respectively). One fifth of participants expected the effect, in both situations, to be very severe (scale on table 1). This opinion was not significantly changed after counselling (table 5). Only three patients regretted having the test. Four patients contacted the department within six months of receiving the results for more counselling. All had seropositive HSV-2 antibody and three had no previous history of genital herpes. Their contact was primarily for more discussion and understanding.

DISCUSSION

To our knowledge, this is the first study to assess the seroprevalence of both HSV-1 and HSV-2 antibodies among GUM clinic attenders in a UK metropolitan city. It is also the first in the United Kingdom to assess patients' knowledge and attitude before and after counselling, and to evaluate their perception of results.

Two serotypes of HSV are recognised, with antibodies usually detectable 8 weeks after the onset of infection.[13] HSV-2 is almost always transmitted sexually,[1] and detection of HSV-2 antibody almost always indicates previous genital herpes infection. Understanding of the seroepidemiology and sociology of genital herpes cannot be obtained without accompanying information regarding HSV-1 infection patterns.[1] HSV-1 is common in the general population and is often acquired non-sexually in childhood, causing orolabial infection. HSV-1, however, can cause genital herpes, and the proportion caused by HSV-1 is increasing. In the United Kingdom, the incidence of new cases of genital herpes caused by HSV-1 can be as high as 50%.[14] However, HSV-2 reactivation and recurrence remain the more prevalent.[15] Thus, although the detection of HSV-2 antibody is essentially indicative of genital herpes infection, its absence does not exclude it. Detection of HSV-1 antibody on the other hand cannot indicate whether the site of infection is oral or genital. Our study population was informed about the difficulties in this area.

The seroprevalence of genital herpes varies worldwide. A seroprevalence rate of HSV-2 antibody as high as 60–90% has been reported in several developing countries. In developed countries, it is estimated that as many as 20% of the general population may be seropositive for the HSV-2 antibody. The prevalence of genital herpes is often substantially higher in high risk populations—for example, STD clinic attenders.[1 16–20] The difference between studies may reflect the difference in ethnicity, social background, and sexual lifestyle between different populations. The rate of HSV-2 seropositivity in our study (overall 20%, males 18%, females 21%) is similar to the only study undertaken in a STD clinic in London[21] (overall 22.7%, males 17.3%, females 24.5%), but higher than in a study done in an STD clinic in a district hospital outside London[22] (overall 15.6%, males 9.9%, females 18.7). The seroprevalence rate of HSV-2 antibody among blood donors in London was reported as 3% in males and 12% in females,[21] while outside London it was 3.2% and 7.8% respectively.[23] In most studies, the rate is higher among females than males. In our study, it is higher in females although the difference is not significant. This may be explained, at least in part, by the older

Table 4 The relation between HSV-1 antibodies and sociodemographic, sexual behaviour, and clinical variables

	HSV-1	Univariate model		Multivariate model		
Variable	No (%)	OR	95% CI	OR	p Value	95% CI
Age (years)						
<25	31/61 (51)	1.00		1.00	0.506	
25–34	60/100 (60)	1.45	0.76 to 2.76	0.58		0.22 to 1.52
⩾35	38/54 (70)	2.30	1.06 to 4.96	0.76		0.15 to 3.89
Ethnicity						
White	106/184 (58)	1.00				
Black	11/14 (79)	2.70	0.73 to 10.00			
Education						
⩾ University level	32/73 (44)	1.00		1.00	0.022	
< University level	94/139 (68)	2.68	1.49 to 4.79	2.58		1.14 to 5.83
Age at first sex (years)						
<18	92/147 (63)	1.00				
18–19	16/36 (44)	0.48	0.23 to 1.00			
⩾20	17/27 (63)	1.02	0.44 to 2.38			
Years of sexual activity						
<5	10/28 (36)	1.00		1.00	0.093	
5–14	61/105 (58)	2.50	1.05 to 5.93	3.18		0.87 to 11.66
15–24	38/51 (75)	5.26	1.94 to 14.26	6.64		1.17 to 37.70
⩾25	16/26 (62)	2.88	0.95 to 8.70	2.55		0.30 to 21.57
Lifetime partners						
<5	45/83 (54)	1.00				
5–9	32/47 (68)	1.80	0.85 to 3.81			
⩾10	50/83 (60)	1.28	0.69 to 2.37			
Use of condom						
Never	15/24 (63)	1.00				
Ever	113/190 (60)	0.88	0.37 to 2.11			
History of other STIs:						
Yes	62/93 (67)	1.00				
No	66/121 (55)	0.60	0.34 to 1.05			
Patient history of cold sores						
Yes	56/69 (81)	1.00		1.00	<0.001	
No/not known	71/144 (49)	0.23	0.11 to 0.45	0.21		0.10 to 0.44
Occupation						
Intellectual	35/65 (54)	1.00				
Manual	45/70 (64)	1.54	0.77 to 3.08			
Student	11/31 (36)	0.47	0.20 to 1.14			

age, the greater number of STDs, the greater number of partners, and the higher proportion of black people among the males (table 2).

In most studies, HSV-2 seropositivity is independently associated with increasing age, lower income, lower education, increased years of sexual activity, previous STDs, multiple sexual partners, and earlier age of first intercourse.[1 16 19–21 24] In our study, only being black or having a history of genital herpes had a significant association with the frequency of HSV-2 infection in the multivariate analysis. An increase in the number of participants in the study might have revealed more significant factors. HSV-2 seropositivity has been suggested as an objective marker of sexual behaviour.[1 21]

Risk factors for the acquisition of HSV-1 usually include increasing age, lower socioeconomic status, and black ethnicity.[1 24] Rates of 60–90% in Europe and rates higher than 90% in Africa have been reported.[1 24] A study undertaken in an STD clinic in London reported the seroprevalence of HSV-1 as 59.5%.[25] In our study, a similar prevalence (60%) was found with no difference between males and females. The prevalence was independently related to lower education, increased years of sexual activity (15–24), and patients' history of cold sores.

In our study, only a third of the study participants with HSV-2 antibody gave a history of genital herpes. This is consistent with other studies and highlighted the poor sensitivity in the clinical diagnosis of genital herpes.[1 16 19–21] Although we do not know which type occurred first, patients with antibodies to HSV-1 and HSV-2 (that is, co-infection) had less history of genital herpes (symptoms/diagnosis) than those with antibody only to HSV-2 (29% compared with 39%). On the other hand, prevalence of HSV-2 antibody is similar in patients with negative or positive antibodies to HSV-1 (21% and 20%, respectively). This is consistent with most studies and indicates that although previous infection with HSV-1 may not decrease the incidence of infection with HSV-2, it does ameliorate its symptoms and decrease its severity. This would be important in vaccine trials. A small number of studies, however, found a reduced prevalence of HSV-2 antibody in patients with positive HSV-1 antibody.[9 24 26]

Although western blot is the "gold standard" for the accurate detection of HSV-1 and HSV-2 antibodies, it is expensive, time consuming, and not widely available for commercial use.[27] In a study comparing the Gull EIA and western blotting tests, the sensitivity and specificity of the Gull EIA were found to be 95% and 96% respectively for HSV-1, and 98% and 97% respectively for HSV-2.[10] In another study,[19] the sensitivity and specificity values of the Gull/Meridian EIA versus western blotting were 91.9% and 98.0%, respectively. The positive and negative predictive values of the assay depend upon the prevalence of the infection among the studied population. The high prevalence of HSV antibodies among genitourinary clinic attenders may warrant its use without a confirmatory test, although equivocal results may need to be confirmed (for example, by the western blotting technique). Participants in our study were informed of the limitations of the test.

Vonau *et al*[28] assessed the knowledge and attitude of pregnant women regarding genital herpes and its serotesting, in an antenatal clinic in London. Eighty per cent of this population wanted to be tested for genital herpes antibodies. In another study performed in a GUM clinic in Leeds,[29] 92% wanted to know if they had been infected with genital herpes. Sixty five per cent expected testing as part of routine screening. In the last two studies, no counselling was given and

Table 5 The answers to the questionnaire

	All patients		
	Before counselling	After counselling	p Value
Q1–Q8: Total scores in the first 8 questions:			
No	798/1736	1521/1736	<0.0001*
Median score (range)	4 (–2 to 8)	8 (2 to 8)	(Z=–11.666)
Q9: Genital herpes is worse than chlamydia or gonorrhoea: No (%)			
	61/196 (31%)	90/201 (45%)	<0.0001† (χ^2 = 16.475)
Q10: Effect on patient if s/he had been diagnosed with genital herpes (median):			
(1 No effect 2 Mild 3 Moderate	4 Severe	5 Very severe)	
	4	4	<0.450*
Q11: Effect on patient if partner had been diagnosed with genital herpes (median):			
(1 No effect 2 Mild 3 Moderate	4 Severe	5 Very severe)	
	4	4	<0.718*
Q12: Would you support the availability of genital herpes serotesting: No (%)			
Yes	204/222 (92%)	216/218 (99%)	<0.0003‡
No	2/222 (0.9%)	0/218 (0%)	
Not sure	16/222 (7%)	2/218 (0.9%)	
Q13: If genital herpes serotesting is available would you prefer it: No (%)			
Included in routine testing for STIs	181/222 (82%)	197/218 (90%)	<0.008‡
Used in selective cases:	30/222 (13%)	19/218 (9%)	
Not sure	11/222 (5%)	2/218 (0.9%)	

*Wilcoxon matched pairs sign rank test.
†McNemar's test.
‡χ^2 test.

patients' understanding of the information provided was not assessed. In our study, patients' knowledge, understanding, and opinion were assessed before and after counselling. Thus, their perception and understanding of the issues surrounding this infection and its serotesting were tested. Patients' knowledge about the infection and its serotesting (Q1–Q8) improved significantly after counselling. Patients in our study not only expressed a strong desire to be tested but also agreed to be tested (97% of the eligible attenders). The percentage of participants supporting serotesting increased from 92% to 99% (p=0.0003), indicating increased awareness of the disease. The number of patients who were unsure of their opinion decreased from 7% to 0.9%, implying that counselling was useful in helping them to decide (table 5).

Knowledge about genital herpes is generally acknowledged to be poor among both patients and clinicians.[3 30] Another study by the authors among general practitioners in the same city[31] demonstrated the lack of knowledge in some areas about genital herpes, especially recent information. Clinician and patient education is an essential component of management. Education of both patients and healthcare providers about genital herpes was one of the recommendations of an advisory panel, recently convened by the Centres for Disease Control and Prevention (CDC) in the United States to address genital herpes prevention.[30]

We anticipated more post-testing problems, especially from those with positive results for HSV-2 antibody. Are we overestimating the potential psychological effect of this test? Is it patients' or physicians' worry? A recent study undertaken in Australia has reported a similar finding regarding the minimal psychological impact of genital herpes serotesting.[32] On the contrary, 32% of our study population were reassured that there was no indication of previous herpes simplex infection—that is, negative results for HSV-1 and HSV-2 antibodies. Other possible explanations of the small number of patients who contacted the unit after discharge with post-testing concerns include "silent suffering" or difficulty in contacting the department (for example, because of moving). The long term effects of receiving the results were not assessed. Some of the patients may suffer later. Other studies are required to assess the short and long term effect of this testing in more detail.

Counselling is not only important in obtaining informed consent, but also necessary to provide patients with knowledge about the infection, combat misconception, assess their need for testing, prepare them for results, help those with positive results to come to terms with the diagnosis and, above all, to help in preventing transmission.[33–36] Counselling in our study was not controlled, as it is difficult to deny one group. However the significant improvement of knowledge, and the smooth acceptance of results without significant post-testing problems, are most likely to be due to the appropriate counselling received by the participants.

A survey carried out among delegates at the annual meeting of the International Herpes Management Forum (IHMF) in 1999 showed that 70% were in favour of judicious use of serology to test for HSV. The advisory panel, mentioned earlier, convened by the CDC in the United States,[30] has recommended that this testing should be routinely employed in the evaluation of genital ulceration. The panel also recommended that patients requesting STD screening or patients with symptoms suggesting an STD should be specifically informed whenever evaluation does not include this serotesting for HSV infection. Munday *et al* in their study[37] found that the type specific serology test contributed to patient management in 79% of cases with recurrent genital ulceration and was also useful for counselling patients. They proposed guidelines for using this test. Many situations emerge where knowledge of this serology could be of value.[38] Proper diagnosis of unrecognised cases of genital herpes (80%) is not only a fundamental right for the patient, but is also an important step in the prevention of this infection.[6] Preventive measures are not currently perfect, but using the available tools and improving them is the way forward.

ACKNOWLEDGEMENTS

The diagnostic kits were provided (at a reduced cost) by Meridian Diagnostics.

We thank Dr S Haque, applied statistician, Research and Development Unit, the Queen Elizabeth Psychiatric Hospital, Birmingham, for carrying out the statistical work for the study. We would also like to thank Dr D Brown, Central Public Health Laboratory, London, for his advice regarding the diagnostic test.

The preliminary data were presented in part, as posters, at the STIs at the Millennium, May 2000, Baltimore, USA (abstract 110), and the

Key messages

- The vast majority of the study population not only wanted to be tested for genital herpes, but also accepted the test when offered
- HSV-2 infection is common and largely unrecognised among our study population
- The psychological impact of introducing type specific HSV serological testing in a clinical setting is minimal
- Counselling could improve patients' awareness of the infection as well as the acceptability of the test and its results.

XIII International AIDS Conference, July 2000, Durban, South Africa (abstract MoPeB2153), and as an oral presentation at the MSSVD meeting, 2000, London.

CONTRIBUTORS

NN, PSA, AHW conceived and designed the study; NN interviewed the participants, collected the data, and wrote the draft of the manuscript; PSA and AHW supervised the study and reviewed the manuscript; and SW carried out the laboratory work.

Authors' affiliations
N Narouz, P S Allan, A H Wade, Department of Genitourinary Medicine, Coventry and Warwickshire Hospital, Coventry, UK
S Wagstaffe, PHLS, Coventry and Warwickshire Hospital, Coventry, UK

REFERENCES

1 **Nahmias AJ**, Lee FK, Beckman-Nahmias S. Sero-epidemiological and -sociological patterns of herpes simplex virus infection in the world. *Scand J Infect Dis* 1999;**69**(suppl):19–36.
2 **Chen CY**, Ballard RC, Beck-Sague CM, *et al*. Human immunodeficiency virus infection and genital ulcer disease in South Africa: the herpetic connection. *Sex Transm Dis* 2000;**1**:21–9.
3 **Kinghorn GR**. Limiting the spread of genital herpes. *Scand J Infect Dis* 1990;(suppl 100):20–5.
4 **Johnson RE**, Nahmias AJ, Magder LS, *et al*. A seroepidemiology survey of the prevalence of herpes simplex virus type 2 infection in the United States. *N Engl J* 1990;**32**1:7–12.
5 **Johnson RE**, Lee F, Hadgu A, *et al*. US genital herpes trends during the first decade of AIDS, prevalences increased in young whites and elevated in blacks. *Sex Transm Dis* 1994;**21**(suppl):S109
6 **Corey L**. Raising the consciousness for identifying and controlling viral STDS: fears and frustrations. *Sex Transm Dis* 1998;**25**:58–69.
7 **Koutsky LA**, Stevens CE, Holmes KK, *et al*. Underdiagnosis of genital herpes by current clinical and viral-isolation procedures. *N Engl J Med* 1992;**326**:1533–9.
8 **Rooney JF**, Felser JM, Ostrove, *et al*. Acquisition of genital herpes from an asymptomatic sexual partner. *N Engl J Med* 1986;**314**:1561–4.
9 **Mertz GJ**, Benedetti J, Ashley R, *et al*. Risk factors for the sexual transmission of genital herpes. *Ann Intern Med* 1992;**116**:197–202.
10 **Ashley RL**, Wu L, Pickering JW, *et al*. Premarket evaluation of a commercial glycoprotein G-based enzyme immunoassay for herpes simplex virus type-specific antibodies. *J Clin Microbiol* 1998;**36**:294–5.
11 **Groen J**, Van Dijk G, Niesters HG, *et al*. Comparison of two enzyme-linked immunosorbent assays and one rapid immunoblot assay for detection of herpes simplex virus type 2-specific antibodies in serum. *J Clin Microbiol* 1998; **36**:845–7.
12 **Ashley RL**. Type-specific antibodies to HSV-1 and HSV-2: review of methodology. *HERPES* 1998;**5**:2.
13 **Slomka MJ**, Ashley RL, Cowan FM, *et al*. Monoclonal antibody blocking tests for the detection of HSV-1 and HSV-2 specific humoral responses: comparison with western blot assay. *J Virol Methods* 1995;**55**:27–35.
14 **Kinghorn GR2**. Genital herpes: natural history and treatment of acute episodes. *J Med Virol* 1993;Suppl 1:33–8.
15 **Benedetti J**, Corey L, Ashley RL. Recurrence rates in genital herpes after symptomatic first-episode infection. *Ann Intern Med* 1994;**121**:847–54.
16 **Fleming DT**, McQuillan GM, Johnson RE, *et al*. Herpes simplex virus type 2 in the United States, 1976 to 1994. *N Engl J Med* 1997;**337**:1105–11.
17 **Cunningham AL**, Lee FK, Ho DW, *et al*. Herpes simplex virus type 2 antibody in patients attending antenatal or STD clinics. *Med J Aust* 1993;**158**:525–8.
18 **Kinghorn GR**. Epidemiology of genital herpes. *J Intern Med Res* 1994;**22**(suppl 1):14A–23A.
19 **Cusini M**, Cusan M, Parolin C, *et al*. Seroprevalence of herpes simplex virus type 2 infection among attenders of a sexually transmitted disease clinic in Italy. *Sex Transm Dis* 2000;**27**,292–5.
20 **Van de Laar MJW**, Termorshuizen F, Slomka MJ, *et al*. Prevalence and correlates of herpes simplex virus type 2 infection: evaluation of behavioural risk factors. *Int J Epidemiol* 1998;**27**:127–34.
21 **Cowan FM**, Johnson AM, Ashley R, *et al*. Antibody to herpes simplex virus type 2 as serological marker of sexual lifestyle in populations. *BMJ* 1994;**309**:1325–9.
22 **Woolley PD**, Chandiok S, Pumphrey J, *et al*. Serological prevalence of herpes simplex virus type 2 amongst GUM clinic attenders in a district general hospital setting. *Int J STD AIDS* 2000;**11**:379–82.
23 **Brown DWG**, Vyse A, Slomka M, *et al*. An age stratified survey of antibody to HSV-1 and HSV-2 in the UK using type specific monoclonal antibody ELISAs (Abstract 0183). 12th Meeting International Society for STD Research, Seville, 1997.
24 **Austin H**, Macaluso M, Nahmias A, *et al*. Correlates of herpes simplex virus seroprevalence among women attending a sexually transmitted disease clinic. *Sex Transm Dis* 1999;**26**:329–34.
25 **Cowan FM**, Johnson AM, Ashley R, *et al*. Relationship between antibodies to herpes simplex virus (HSV) and symptoms of HSV infection. *J Infect Dis* 1996;**174**:470–5.
26 **Brown ZA**, Selke S, Zeh J, *et al*. The acquisition of herpes simplex virus during pregnancy. *N Engl J Med* 1997;**337**:509–15.
27 **Ashley RL**. Laboratory techniques in the diagnosis of herpes simplex infection. *Genitourin Med* 1993;**69**:174–83.
28 **Vonau B**, Low-Beer N, Barton S, *et al*. Antenatal serum screening for genital herpes: a study of knowledge and attitude of women at a central London hospital. *Br J Obstet Gynaecol* 1997;**104**:347–9.
29 **Fairley I**, Monteiro EF. Patient attitudes to type specific serological tests in the diagnosis of genital herpes. *Genitourin Med* 1997;**73**:259–62.
30 **Handsfield HH**, Stone KM, Wasserheit JN. Prevention agenda for genital herpes. *Sex Transm Dis* 1999;**26**:228–31.
31 **Narouz N**, Allan PS, Wade AH. Genital herpes: general practitioners' knowledge and opinions. *Sex Transm Infect* 2002;**78**:198–200.
32 **Smith A**, Denham I, Keogh L, *et al*. Psychosocial impact of type-specific herpes simplex serological testing on asymptomatic sexual health clinic attendees. *Int J STD AIDS* 2000;**11**:15–20.
33 **Connor-Greene PA**. The role of counselling in the treatment of genital herpes. *J Am Coll Health* 1986;**34**(6):286–7.
34 **Higgins D**, Galavotti C, O'Reilly K, *et al*. Evidence for the effects of HIV antibody counselling and testing on risk behaviour. *JAMA* 1991;**266**:2419–29.
35 **Langenberg A**, Benedetti J, Jenkins J, *et al*. Development of clinically recognisable genital lesions among women previously identified as having 'asymptomatic'HSV-2 infection. *Ann Intern Med* 1989:882–7.
36 **Corey L**, Ashley R, Sekulovich A, *et al*. Lack of efficacy of a vaccine containing recombinant gD2 and gB2 antigens in MF59 adjuvant for the prevention of genital HSV-2 acquisition. Abstract for the 37th ICACC, Toronto, Ontario, Canada, 1997.
37 **Munday PE**, Vuddamalay J, Slomka MJ, *et al*. Role of type specific herpes simplex virus serology in the diagnosis and management of genital herpes. *Sex Transm Infect* 1998;**74**:175–8.
38 **Cowan FM**. Testing for type-specific antibody to herpes simplex virus-implication for clinical practice. *JAC* 2000;**45**(T3):9–13.